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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/681,319	10/09/2003	Satoshi Asano	031175	3377

38834 7590 12/12/2005

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EXAMINER	
MCNELIS, KATHLEEN A	

ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 12/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	**Application No.** 10/681,319	**Applicant(s)** ASANO ET AL.	
	Examiner Kathleen A. McNelis	**Art Unit** 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 09 October 2003.
2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-16 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) 1-16 is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a)☐ All b)☐ Some * c)☐ None of:
1.☐ Certified copies of the priority documents have been received.
2.☐ Certified copies of the priority documents have been received in Application No. _____.
3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 10/9/2003.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claims Status

Claims 1-16 as originally submitted for examination.

DETAILED ACTION

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-5, 7, 9, 11-13 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Bruening et al. (U.S. Pat. No. 5,120,443).

With respect to claim 1, Bruening et al. discloses a method for removing, separating and concentrating rhodium (Rh), iridium (Ir) and Ruthenium (Ru) from a source containing other ions by bringing the source solution into contact with a polyalkylene-polyamine containing ligand covalently bonded through and organic spacer silicon grouping to a solid inorganic support (abstract). The "other ions" are impurity elements as in instant claim 1. The "polyalkylene-polyamine containing ligand covalently bonded through an organic spacer silicon grouping to a solid inorganic support" is a polyamine based anion exchange resin as in instant claim 1. Bruening et al. discloses in example 7 the use of this resin with a solution of Rh, Ru, Ir, Pt, Pd, Cu, and Fe in aqueous HCl solution. The solution is drawn through the resin then the resin is then washed with an HCl solution. The resin is then eluted into an HCl recovery solution (col. 12 line 63 - col. 13 line 18), forming an effluent.

With respect to claim 3, the resin is washed with a dilute HCl solution (col. 13 lines 1-5). With respect to claim 4, the diluted HCl solution has a chloride ion concentration of 0.1 M (col. 12 lines 1-10), which is less than 4 mol/L.

With respect to claim 5, the washed resin is contacted with a receiving liquid of diluted hydrochloric acid (example 7, col. 12 line 62- col. 13 line17) or thiourea and hydrochloric solutions (example 9, col. 13 lines 25-57).

With respect to claim 7, Bruening et al. discloses a process for separating and recovering Ir, Ru, Rh from a solution with impurities as described above regarding claim 1, wherein the receiving solution is a thiourea and hydrochloric solution (example 9) as described above regarding claim 5. The temperature of the thiourea solution is disclosed in example 9 as 70 °C (col. 13 lines 24-47), which is within the claimed range of between 60 and 90 °C.

With respect to claims 9, 11-13 and 15, Bruening et al. teaches that the PGM is at least one element selected from the group of Ir, Rh and Ru (abstract).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 2, 6, 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruening et al. (U.S. Pat. No. 5,120,443) in view of EP 1,167,555 (EP '555).

Bruening et al. was discussed above for the rejection of claims 1 and 5.

Bruening et al. discloses a process for separating and recovering Ir, Ru, and/or Rh from a solution with impurities as described above regarding claim 1. Further, Bruening et al. teaches that the process relies on the ability to first selectively attract and bind the selectively remove complexes of Rh, Ir and Ru (col. 7 lines 27-60).

Bruening et al. does not teach that the chloride solution is maintained at an ORP of 700 to 1100 mV as in claim 2, or that the HCl solution has a chloride ion concentration of 4 mol/L or more as in claim 6.

EP '555 teaches a method of chromatographic interseparation of PGM wherein Rh and Ir are eluted as separate fractions [0001]. EP '555 teaches that in prior art applications, the elution of Ir was slow and the resulting metal concentration dilute compared to other metal fractions [0006]. EP '555 teaches an improvement to the prior art, using a 3-6 M HCl solution [0022] and bringing the redox potential to between 770 and 900 mV to control the oxidative state of Ir. This provides the maximum separation of Ir from Rh [0009-0010]. ORP and concentration of eluting solutions are therefore recognized as result-effective variables in the art, which are varied to affect the absorption and elution of metals of interest. It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the solution concentration and ORP as result-effective variables to affect the metal absorption and elution from the resin (see M.P.E.P 2144.05, II, B). Further, it would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the ORP and elution steps by using a 3-6 M HCl solution while maintaining a redox potential of between 770 and 900 mV as taught by EP '555 in the PGM separation process of Bruening et al. to achieve maximum separation of Ir from Rh as taught by EP '555. The ORP range taught by EP '555 of between 770 and 900 mV is within the claimed range of 700 to 1100 mV. The range of between 3-6 M HCl overlaps with the claimed range of 4 mol/L or more in claim 6. It would have been obvious to one of ordinary skill in the art at the time the invention was made to elute with a HCl solution of between 4 and 6 mol/L since EP '555 teaches that a solution of between 3-6 M HCl is preferred [0022].

With respect to claims 10 and 14, Bruening et al. teaches that the PGM is at least one element selected from the group of Ir, Rh and Ru (abstract).

Claims 7 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruening et al. (U.S. Pat. No. 5,120,443).

Bruening et al. was discussed above for the rejection of claims 1 and 5.

In example 7, Bruening et al. discloses a process for separating and recovering Ir, Ru, Rh from a solution with impurities as described above regarding claim 1, wherein the receiving solution is alternately hydrochloric acid (example 7) or thiourea and hydrochloric solutions (example 9), described above regarding claim 5.

Bruening et al. does not disclose that the temperature is between 60 and 90 °C for the hydrochloric acid solution as in instant claim 7.

Bruening et al. discloses that the temperature of the HCl solution is 90 °C or higher (col. 13 lines 1-5), which overlaps with the claimed range of about 60 to 90 °C. It has been well settled that where the applied prior art teaches a range of compositions or properties overlapping a claimed range, a prima facie case of obviousness exists (M.P.E.P § 2144.05). It would have been obvious to one of ordinary skill in the art at the time the invention was made to elute the resin with HCl at a temperature of 90 °C, since Bruening et al. teaches that temperatures of 90 °C or higher are operable.

With respect to claim 15, Bruening et al. teaches that the PGM is at least one element selected from the group of Ir, Rh and Ru (abstract).

Claims 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruening et al. (U.S. Pat. No. 5,120,443) in view of Ji et al. (U.S. Pat. No. 6,660,059).

Bruening et al. was discussed above for the rejection of claim 1.

Bruening et al. discloses a process for separating and recovering Ir, Ru, and/or Rh from a solution with impurities as described above regarding claim 1, wherein the receiving solution is an aqueous thiourea solution (example 9, col. 13 lines 25-47).

Bruening et al. does not teach that the elution effluent is subsequently made alkaline, then heated to recover the PGM in the form of sulfide as in instant claim 8.

Ji et al. discloses a process for recovering precious metals from refractory materials (abstract), wherein Ji et al. defines precious metals to include PGM (col. 1, lines 20-25). Following separation of the precious metal bearing solution, the pH of the solution is adjusted to alkaline conditions and the precious metals are precipitated as sulfides (col. 13 lines 45-67). The temperature is maintained between about 5 and 40 °C (col. 14 lines 1-16) which range includes a portion that is "heated" as in instant claim 8. Ji et al teaches that recovering the precious metal in this way reduces impurities in the solution (col. 13 lines 45-67) and results in relatively high rates of precious metal recovery (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to precipitate the PGM as a sulfide by increasing the solution pH as taught by Ji et al. following separation in the process of Bruening et al. to benefit from relatively high rates of precious metal recovery as taught by Ji et al.

With respect to claim 16 Bruening et al. discloses that the PGM is at least one element selected from the group of Ir, Rh and Ru (abstract).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kathleen A. McNelis whose telephone number is 571-272-3554. The examiner can normally be reached on M-F 8:00 AM to 4:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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